Sphincter Preservation in Rectal Cancer

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Opinion statement
Distal rectal cancer poses two challenges to the oncologist: local tumor control and sphincter preservation. The abdominoperineal resection (APR), long considered the standard treatment of tumors with a distal edge located up to 6 cm from the anal verge, provides local control in many patients but results in sphincter loss with a permanent colostomy. This is a critical limitation. Consequently, there has been significant interest in sphincter-conserving approaches, frequently combining chemoradiation with surgery.

These approaches have evolved along two fronts. For patients with small rectal cancers confined to the rectal wall, local excision techniques with and without chemoradiation may offer comparable local control and survival rates as an APR and preserve sphincter function. For patients with larger and more invasive tumors of the distal rectum where local excision is inappropriate, preoperative chemoradiation promotes tumor regression and may facilitate a resection sparing the sphincter with a coloanal anastomosis. Preliminary results from single institution studies appear promising.

In both these settings (favorable and more invasive rectal cancer), chemoradiation is employed to compensate for the limitations of the sphincter-preserving surgical technique. In local excision procedures, the excision margins are invariably small, and the mesorectum (lymphatics, soft tissue) surrounding the tumor is not excised. For patients undergoing resection with coloanal anastomosis, there are narrow radial and distal surgical margins. With these approaches of chemoradiation and sphincter-sparing surgery, satisfactory local control and survival with avoidance of colostomy are possible for many patients with distal rectal cancer.

Introduction
Since the introduction of the abdominoperineal resection by Miles in 1908, a surgical approach to removal of this tumor and its adjacent tissues has offered a high probability of local control and survival [1]. Despite these merits, the abdominoperineal resection has profound drawbacks, including loss of anorectal function with a permanent colostomy and a high incidence of sexual and genitourinary dysfunction. The possibility of having a colostomy continues to defer even patients with symptoms from pursuing early intervention. To overcome these limitations, an array of surgical procedures has been developed, ranging from simple excision to complex resections with reconstruction. In appropriately staged patients, these operations appear to offer not only comparable rates of local control as the abdominoperineal resection but, importantly, preservation of sphincter integrity. Continued experience allows for more clearly defined selection criteria and the role of radiation therapy and chemotherapy.

One obvious consideration in the selection of patients for sphincter preservation is tumor location within the rectum [1,2]. Patients with tumors in the upper rectum have long been well managed by a sphincter-preserving anastomosis. With the advent of the end-to-end anastomatic stapling instrument, tumors of the mid-rectum, even in a narrow pelvis, become amenable to treatment by low anterior resection and preservation of the anal sphincter. Although with the lower anastomoses, there is a real inci-
dence of sexual dysfunction and less than perfect anorectal function, the avoidance of a permanent colostomy is perceived by the patient as an extremely fortunate situation. In contrast to tumors of the upper and middle rectum, management of distal rectal cancer continues to pose a major challenge to the surgeon and oncologist. Clearly, an important consideration in treatment selection of patients with low rectal cancer is the local extent of the primary tumor.

For small and intramural tumors (favorable rectal cancer) in the distal rectum, there has been increasing interest in local excision procedures as an alternative to the abdominoperineal resection. These operations involve an excision of the primary tumor through the anus (per anal excision), by division of the anal sphincter (transanal, transsphincteric, or Park’s resection), or by using a parasacral approach (Kraske). The latter two procedures are somewhat more extensive than a simple per anal excision and have a greater degree of associated morbidity. Clearly, this technique is limited to tumors that can be excised and the excision site closed without significant narrowing of the rectal lumen.

For larger and more invasive (clinical T3) tumors of the distal rectum where local excision is inappropriate, preoperative irradiation and, more recently, preoperative chemoradiation have been used to promote tumor regression, thus facilitating a resection sparing the sphincter and insetting the left colon as a coloanal anastomosis. The goal of the preoperative therapy is to convert the surgical procedure from an abdominoperineal resection to a sphincter-preserving operation.

### Treatment

- The usual criteria for rectal cancers suitable for local excision are as follows: tumor size less than 4 cm, location 8 cm or less from the anal verge, well- or moderately well-differentiated histology, mobile, not ulcerated, and no suspicion of perirectal or presacral nodes [3]. Patients should be selected who have tumors confined to the rectal wall, where there is a low probability of lymph node metastases.

- Although impressive advances have been made in the radiologic imaging of rectal cancer, digital examination by an experienced practitioner is a reasonably reliable method of determining the depth of penetration of the primary tumor. The accuracy rates of staging the primary tumor by digital examination has been reported to be approximately 80% [4]. Because lymph node metastases are seen only microscopically in a high percentage of cases, it is not surprising that digital examination is insensitive at identifying metastatic perirectal nodal involvement.

- In addition to digital examination, endoscopic ultrasonography (EUS) has been used as a staging tool in assessing local tumor extent as well as lymph node involvement [5–8]. Correlation of ultrasound T stage to pathologic stage ranges from 70% to more than 90% in most series [7]. To achieve high accuracy rates (90% or greater), this examination must be performed by experienced operators. In a study from the University of Minnesota, the accuracy rates rose from 59% during the early phase of the study to 88% in the latter phase of the study [7]. More recently, endorectal magnetic resonance imaging (MRI) has been employed as a staging tool for rectal cancer [9]. This imaging technique is less operator dependent than endoscopic ultrasound and provides comparable results. Because ultrasound, endorectal MRI, and other imaging modalities can only visualize macroscopic changes, these techniques are inherently limited in their ability to discriminate lesser degrees of invasion between tumors. In one study, 30% of 24 patients believed to have T2 lesions based on EUS in fact had transmural invasion pathologically [8]. In assessing pararectal nodal involvement, EUS and endorectal MRI have been less helpful, with reported accuracy rates ranging from 50% to 80% [6]. With these caveats, EUS and endorectal MRI are generally acknowledged to be complementary to digital examination in staging and more accurate than axial computed tomography (CT) scans.